

## CLAIMS

1. A lighting control system, comprising two or more lighting devices and one or more illumination comparing devices,  
5 wherein the illumination comparing device supplies to the lighting devices a comparison result in which a sampled illumination of an arbitrary position and a target illumination are compared,  
the two or more lighting devices carry out a judgment based on the comparison result obtained from the illumination comparing device and  
10 repetitively increase/decrease their respective light intensities, and  
the illumination of the arbitrary position is substantially controlled to the target illumination.
2. A lighting control system,  
15 comprising two or more lighting devices and one or more illumination comparing devices,  
wherein the illumination comparing device supplies to the lighting devices a comparison result in which a sampled illumination of an arbitrary position and a target illumination are compared,  
20 the illumination comparing device does not specify a lighting device when supplying the comparison result to the lighting devices,  
the two or more lighting devices carry out a judgment based on the comparison result obtained from the illumination comparing device and  
repetitively increase/decrease their respective light intensities, and  
25 the illumination of the arbitrary position is substantially controlled to the target illumination.
3. A lighting control system, comprising two or more lighting devices and one or more illumination comparing devices,  
30 wherein the illumination comparing device is provided with an

illumination sampling portion that samples illumination, an illumination information storage portion that stores illumination information indicating a target illumination, and a comparison result transmitter portion, wherein a comparison result in which a sampled illumination sampled by the illumination sampling portion and the illumination information are compared is transmitted to the lighting devices by the comparison result transmitter portion,

the lighting devices are respectively provided with a transmitter-receiver portion having at least a receiver function, a judgment control portion, and a light source; the transmitter-receiver portion receives the comparison result sent by the illumination comparing device; the judgment control portion carries out a predetermined judgment based on the comparison result so that the light intensity of the light source can be controlled based on a result of the predetermined judgment, and the control of the light intensity includes light variation control in which the light intensity is changed from a current light intensity by a predetermined amount of light variation and return control in which a light intensity is returned to a direction reverse to the light variation control, and

when the predetermined judgment of the selected lighting device is that a predetermined condition is met after at least one lighting device selected from the lighting devices has carried out the light variation control, a lighting device including at least one lighting device other than the selected lighting device is selected and the light variation control and the predetermined judgment using the judgment control portion are carried out in the selected lighting device, and when the predetermined judgment after the light variation control is that the predetermined condition is unmet, in order to meet the predetermined condition, the lighting device including at least one of the selected lighting devices carries out the return control to make the sampled illumination approach the target illumination.

4. The lighting control system according to claim 3,  
wherein when the predetermined condition is unmet, a light intensity of a lighting device including at least one of the selected lighting devices is changed by the return control and, after the predetermined condition becomes met, the sampled illumination is made to approach the target illumination by shifting to selection of a lighting device including at least one of a lighting device other than the selected lighting device.
5. The lighting control system according to claim 3 or 4,  
wherein the lighting devices including at least one of the selected lighting devices are all the lighting devices of the two or more lighting devices.
6. A lighting control system, having two or more lighting devices and one or more illumination comparing devices,  
wherein the illumination comparing device is provided with an illumination information storage portion that stores at least one piece of illumination information indicating a target illumination, at least one illumination sampling portion that samples an illumination, and a judgment portion that judges a relation between the target illumination indicated by the illumination information and a sampled illumination sampled by the illumination sampling portion, wherein the judgment portion supplies the judgment result to the lighting devices,  
the lighting devices are respectively provided with a judgment control portion and a light source, wherein the judgment control portion carries out a predetermined judgment based on the acquired judgment result so that the light intensity of the light source can be controlled based on a result of the predetermined judgment, and the control of the light intensity includes light variation control in which the light intensity is varied from a current light intensity by a predetermined amount of light

variation and return control in which a return is made in a direction reverse to the light variation control, and

the judgment control portion carries out the predetermined judgment after at least one selected lighting device from the lighting devices carries out the light variation control at least one time, after which a lighting device including at least one lighting device other than the selected lighting device is selected and, after the light variation processing has been carried out at least one time in the selected lighting device, the judgment control portion carries out the predetermined judgment and when the predetermined judgment is that the predetermined condition is unmet, the lighting device including at least one of the selected lighting devices carries out the return control in order to meet the predetermined condition to make the sampled illumination approach the target illumination.

7. A lighting control system, having two or more lighting devices and two or more illumination comparing devices,

wherein the illumination comparing device is provided with an illumination information storage portion that stores illumination information indicating a target illumination, an illumination sampling portion that samples an illumination, and a judgment portion that judges a relation between the target illumination indicated by the illumination information and a sampled illumination sampled by the illumination sampling portion, wherein the judgment portion supplies the judgment result to the lighting devices,

the lighting devices are respectively provided with a judgment control portion and a light source, wherein the judgment control portion carries out a predetermined judgment based on the acquired judgment result so that the light intensity of the light source can be controlled based on a result of the predetermined judgment, and the control of the light intensity includes light variation control in which the light intensity is

varied from a current light intensity by a predetermined amount of light variation and return control in which a return is made in a direction reverse to the light variation control, and

the judgment control portion carries out the predetermined judgment after at least one selected lighting device from the lighting devices carries out the light variation control at least one time, after which a lighting device including at least one lighting device other than the selected lighting device is selected and, after the light variation processing has been carried out at least one time in the selected lighting device, the judgment control portion carries out the predetermined judgment and when the predetermined judgment is that the predetermined condition is unmet, the lighting device including at least one of the selected lighting devices carries out the return control in order to meet the predetermined condition to make the sampled illumination approach the target illumination.

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8. The lighting control system according to claim 6 or 7, wherein after at least one of the two or more lighting devices is selected and a light intensity is subjected to the light variation control, when the predetermined condition is judged to be met according the predetermined judgment of the judgment control portion of the selected lighting device, the sampled illumination is made to approach the target illumination by shifting to the light variation control of a light intensity of a light source of a lighting device including at least one of a lighting device other than the selected lighting device, and when the predetermined condition is judged to be unmet, the light intensity of the light source of the lighting device including at least one of the selected lighting devices is subjected to return control to meet the predetermined condition, after which a lighting device including at least one lighting device other than the selected lighting device is selected and light variation control is carried out to make the sampled illumination approach the target illumination.

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9. The lighting control system according to claim 6 or 7, wherein at least one lighting device of the two or more lighting devices is selected and light variation control is performed until the predetermined condition becomes unmet, and when the predetermined condition becomes unmet, a light intensity of a light source of a lighting device including at least at one of the selected lighting devices is subjected to return control to meet the predetermined condition, after which a lighting device including at least one lighting device other than the selected lighting device is selected and light variation control is carried out to perform control such that the sampled illumination is made to approach the target illumination.

10. The lighting control system according to claim 8 or 9, wherein the lighting devices, including at least one of the selected lighting devices that is subjected to the return control, are all the lighting devices of the two or more lighting devices.

11. The lighting control system according to claim 6 or 7, wherein at least one lighting device of the two or more lighting devices is selected and light variation control is performed until the predetermined condition becomes unmet, and when the predetermined condition becomes unmet, light intensities of light sources of the two or more lighting devices excluding the selected lighting device are subjected to light variation control, and when a large-small relation between the sampled illuminations and the corresponding target illuminations does not become a reverse relation in contrast to when the predetermined condition is being met, the light intensities of light sources of the two or more lighting devices excluding the selected lighting device are subjected to return control and after return control is conducted such that the light intensity of the light source of the selected lighting device returns to a previous direction, at least



one lighting device different from the selected lighting device is selected and light variation control is carried out to perform control such that the sampled illumination is made to approach the target illumination.

5     12.     A lighting control system, comprising two or more lighting devices and one or more illumination comparing devices,

          wherein the illumination comparing device is provided with an illumination sampling portion that samples illumination, an illumination information storage portion that stores illumination information indicating  
10     a target illumination, and a comparison result transmitter portion, wherein a comparison result in which a sampled illumination sampled by the illumination sampling portion and the illumination information are compared is transmitted to the lighting devices by the comparison result transmitter portion,

15           the lighting devices are respectively provided with a transmitter-receiver portion having at least a receiver function, a judgment control portion, and a light source; the transmitter-receiver portion receives the comparison result sent by the illumination comparing device; the judgment control portion carries out a predetermined judgment based on  
20     the comparison result so that the light intensity of the light source can be controlled based on a result of the predetermined judgment, and the control of the light intensity includes light variation control in which the light intensity is changed from a current light intensity and return control in which a light intensity is returned to a direction reverse to the light  
25     variation control,

          the lighting devices respectively carry out the light variation control and, after the light variation control, when the predetermined judgment is that a predetermined condition is unmet, the lighting devices carry out the return control in order to meet the predetermined condition, and

30           the sampled illuminations of the lighting devices are made to

approach the target illumination by setting an amount of light variation in the light variation control as one of an amount varied randomly based on a predetermined amount of light variation, an amount that is a return amount of light in the return control randomly varied, or an amount in  
5 which both are randomly varied.

13. The lighting control system according to any of claims 3 to 12, wherein prior to selection of the lighting devices, the light intensities of the light sources of all the lighting devices are set to a maximum light intensity  
10 or a minimum light intensity capable of being produced by all the lighting devices, or when the predetermined condition is not met, the light intensities of all the lighting devices are varied in a light variation direction of the return control in order to meet the predetermined condition.

15 14. The lighting control system according to any of claims 3 to 13, wherein when there is a single illumination sampling portion in the lighting control system, the judgment control portion judges that the predetermined condition is met when the sampled illumination is in a constant relation with the target illumination and judges that the predetermined condition is  
20 unmet when the sampled illumination is not in a constant relation with the target illumination, and

when there are two or more illumination sampling portions, the judgment control portion judges that the predetermined condition is met when the sampled illuminations are all in a constant relation with the  
25 corresponding target illuminations and judges that the predetermined condition is unmet when even one is not in a constant relation.

15. The lighting control system according to claim 14, wherein the aforementioned “in a constant relation” is a relation in which the sampled  
30 illumination is larger than the corresponding target illumination and the



predetermined amount of light variation in a case of this relation is an amount of light reduction.

16. The lighting control system according to claim 14, wherein the  
5   aforementioned “in a constant relation” is a relation in which the sampled illumination is smaller than the corresponding target illumination and the predetermined amount of light variation in a case of this relation is an amount of light increase.

10   17. The lighting control system according to any of claims 3 to 14, wherein the predetermined amount of light variation is an amount of light variation based on a difference between an initial light intensity and a threshold light intensity of a light source.

15   18. The lighting control system according to claim 17, wherein the threshold light intensity is a light intensity of when light intensities of the two or more lighting devices are changed from the initial light intensity and the predetermined condition becomes unmet, or immediately prior to the predetermined condition becoming unmet.

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19. The lighting control system according to any of claims 3 to 13, wherein at least one of the predetermined amount of light variation and the return control amount of light is an amount of light variation based on a differential illumination between the sampled illumination and the target  
25   illumination.

20. The lighting control system according to any of claims 3 to 13, wherein at least one of the predetermined amount of light variation and the return control amount of light is set for each of the light sources.

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21. The lighting control system according to any of claims 3 to 13,  
wherein at least one of the predetermined amount of light variation and the  
return control amount of light is reduced in response to a convergence in  
which the sampled illuminations approach the target illuminations, or  
5 reduced along with a passing of time until convergence.

22. The lighting control system according to any of claims 3 to 13,  
wherein a selection number of the selected lighting devices is made to  
approach one in response to a convergence in which the sampled  
10 illuminations approach the target illuminations.

23. A lighting control system, comprising two or more lighting devices  
and one or more illumination comparing devices,  
wherein the illumination comparing device is provided with an  
15 illumination sampling portion that samples illumination, an illumination  
information storage portion that stores illumination information indicating  
a target illumination, and a comparison result transmitter portion, wherein  
a comparison result, in which a sampled illumination sampled by the  
illumination sampling portion and the target illumination indicated by the  
20 illumination information are compared, is transmitted by the comparison  
result transmitter portion,

the two or more lighting devices are respectively provided with a  
transmitter-receiver portion having at least a receiver function, a judgment  
control portion, and a light source; the transmitter-receiver portion receives  
25 the comparison result sent by the comparison result transmitter portion;  
the judgment control portion carries out a predetermined judgment based  
on the received comparison result so that the light intensities of the light  
sources can be controlled based on the judgment, and

the judgment control portion of at least one of the two or more  
30 lighting devices randomly changes the light intensities of the light sources

and the sampled illuminations are made to approach the target illuminations by narrowing a range in which the judgment control portion randomly changes the light intensities based on the comparison result received at the transmitter-receiver portion.

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24. The lighting control system according to claim 23,

wherein the light intensities of all the two or more lighting devices are respectively changed randomly and the sampled illumination is made to approach the target illumination by narrowing a range in which the judgment control portion randomly changes the light intensity based on the comparison result received at the transmitter-receiver portion.

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25. The lighting control system according to claim 23 or 24, wherein a plurality of illumination comparing devices are provided, the judgment control portions of the two or more lighting devices total the comparison results received from the plurality of illumination comparing devices to calculate an evaluation value and the sampled illuminations are made to approach the target illuminations by narrowing a range of randomly changed light intensities based on the evaluation value.

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26. The lighting control system according to any of claims 23 to 25, wherein the illumination comparing device compares the sampled illuminations and the corresponding target illuminations and transmits illumination difference information as the comparison result so that the received comparison result is evaluated in the judgment control portion of at least one of the lighting devices, and narrows the range in which light intensities are randomly changed so as to increase an occurrence rate of light intensities corresponding to evaluations of small illumination differences indicated by the illumination difference information and make the sampled illuminations approach the target illuminations.

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27. The lighting control system according to any of claims 23 to 25,  
wherein the illumination comparing device transmits large-small  
information indicating which of the sampled illumination and the  
5 corresponding target illumination is larger, and the judgment control  
portion of the at least one lighting device of the two or more lighting devices  
counterbalances large information and small information of the large-small  
information based on the received comparison result to narrow a range in  
which light intensities are randomly changed so as to make the sampled  
10 illuminations approach the target illuminations.

28. The lighting control system according to any of claims 1 to 27,  
wherein at least one of the illumination information and a condition of the  
two or more lighting devices in light variation control is displayed on a  
15 display.

29. The lighting control system according to any of claims 1 to 27,  
wherein a light intensity of a light source of the lighting devices at a final  
stage of the convergence can be stored and the light intensity of the light  
20 source of the lighting devices can be reproduced by receiving an instruction.

30. A light source comprising the lighting control system according to  
any of claims 3 to 29.

25 31. A lighting device comprising the lighting control system according to  
any of claims 1 to 29.

32. An illumination comparing device comprising the lighting control  
system according to any of claims 1 to 29.

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33. A control system, having two or more control target devices and one or more judgment devices,

wherein the judgment device is provided with a reference information storage portion that stores reference information, an observation information sampling portion that samples observation information, and a judgment portion that judges whether or not the reference information and the observation information meet a predetermined condition, and sends a judgment result of the judgment portion to the two or more control target devices,

the control target devices can control a control amount based on the judgment result and the control includes variation control, in which a current control value is changed by a predetermined control amount, and return control, in which a return is made to a reverse direction to a direction of change of a predetermined control amount, and

the judgment portion carries out a judgment as to whether or not the predetermined condition is met after at least one selected control target device from the control target devices carries out the variation control at least one time, after which a control target device including at least one control target device other than the selected control target device is selected and, after the variation control has been carried out at least one time in the new selected control target device, the judgment portion of the selected control target device carries out the judgment and when the judgment portion judges that the predetermined condition is unmet, the control target devices including at least one of the selected control target devices carry out the return control to make the observation information approach the reference information in order to meet the predetermined condition.

34. The control system according to claim 33, wherein after at least one control target device is selected and variation control is performed when the judgment result meets the predetermined condition, and a control target

device including at least one control target device other than the selected control target device is selected and subjected to variation control when the predetermined condition is met, and when the predetermined condition becomes unmet, return control is performed with a control amount of the control target devices including at least one control target device other than the selected control target device to meet the predetermined condition, after which a control target device including at least one control target device other than the selected control target device is selected and variation control is repeated to perform control such that all the observation information is made to approach the corresponding reference information.

35. The control system according to claim 33, wherein at least one control target device is selected and the variation control is performed until the predetermined condition becomes unmet when the judgment result meets the predetermined condition, and when the predetermined condition becomes unmet, return control is performed with a control amount of the control target devices including at least one control target device other than the selected control target device to meet the predetermined condition, after which a control target device including at least at one control target device other than the selected control target device is selected and variation control is repeated to perform control such that all the observation information is made to approach the corresponding reference information.

36. The control system according to claim 33, wherein at least one control target device is selected and the variation control is performed until the predetermined condition becomes unmet when the judgment result meets the predetermined condition, and when the predetermined condition becomes unmet, variation control is performed on a control amount of all the control target devices excluding the selected control target devices, and when a relation reverse to the constant relation does not occur at all points



of observation, control amounts of all the control target devices excluding the selected control target devices are subjected to return control in a previous direction, and after the predetermined condition becomes met by return control being conducted on the control amounts of the selected control target devices in a previous direction, a control target device including at least at one control target device other than the selected control target device is selected and variation control is repeated to perform control such that all the observation information is made to approach the corresponding reference information.

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37. A control system, being a control system having two or more control target devices and one or more judgment devices,

wherein the judgment device is provided with a reference information storage portion that stores reference information, an observation information sampling portion that samples observation information, and a judgment portion that judges whether or not the reference information and the observation information meet a predetermined condition, and sends a judgment result of the judgment portion to the two or more control target devices,

20 the control target devices can control a control amount based on the judgment result and the control includes variation control, in which a current control value is changed by a predetermined control amount, and return control, in which a return is made to a reverse direction to a direction of change of a predetermined control amount,

25 the control target devices respectively carry out the variation control and, after the variation control, when the predetermined judgment is that a predetermined condition is unmet, the control target devices carry out the return control in order to meet the predetermined condition, and

the observation information of the control target devices is made to approach the reference information by setting an amount of variation in the

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variation control as one of an amount varied randomly based on a predetermined amount of variation, an amount that is a return variation amount in the return control randomly varied, or an amount in which both are randomly varied.

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38. The control system according to any of claims 33 to 37, wherein prior to selection of the control target devices, the control amounts of all the control target devices are set to a maximum value or a minimum value in order to meet the predetermined condition, or return control is conducted  
10 on the control amounts of all the control target devices to meet the predetermined condition.

39. The control system according to any of claims 33 to 38, wherein when the reference information storage portion stores a single set of  
15 reference information, and the observation information sampling portion samples a single set of observation information, the judgment result is that the predetermined condition is met when the observation information and the corresponding reference information are in a constant relation, and the judgment result is that the predetermined condition is unmet when not  
20 in a constant relation, and when the reference information storage portion stores two or more sets of reference information and the observation information sampling portion samples two or more sets of observation information, the judgment result is that the predetermined condition is met when the two or more sets of observation information are all in a constant  
25 relation with the corresponding two or more sets of reference information, and the judgment result is that the predetermined condition is unmet when even one is not in a constant relation.

40. The control system according to claim 39, wherein the “in a constant  
30 relation” is a relation in which the observation information is larger than

the corresponding reference information and in case of this relation the variation control is a control in which the observation information is lowered.

5 41. The control system according to claim 39, wherein the “in a constant relation” is a relation in which the observation information is smaller than the corresponding reference information and in case of this relation the variation control is a control in which the observation information is increased.

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42. The control system according to any of claims 33 to 41, wherein a control width of at least one of the control amount of the control target device and a control amount of the return control is set for each of the control target devices.

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43. The control system according to any of claims 33 to 42, wherein a control width of at least one of the control amount of the control target device and a control amount of the return control is reduced in response to a convergence, or reduced along with a passing of time until convergence.

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44. The control system according to any of claims 33 to 43, wherein a selection number of the selected control target devices is made to approach one in response to a convergence.

25 45. A control system, being a control system having two or more control target devices and one or more judgment devices,

wherein the judgment device is provided with a reference information storage portion that stores reference information, an observation information sampling portion that samples observation  
30 information, and a comparison portion that compares the reference

information and the observation information, and sends a comparison result to the control target devices,

the control target device control a control amount based on the judgment result, and

5           at least one of the control target devices randomly changes the amount of control and the observation information is made to approach the reference information by narrowing a range in which the judgment control portion randomly changes the amount of control based on the received comparison result.

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46.       The control system according to claim 45, wherein all the control target devices randomly change the respective amount of control and the observation information is made to approach the reference information by narrowing a range in which the control target devices randomly change the control amounts based on the received comparison result.

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47.       The control system according to claims 45 or 46, wherein a plurality of judgment devices are provided, the control target devices total the comparison results received from the plurality of judgment devices to calculate an evaluation value and the observation information is made to approach the reference information by narrowing a range of randomly changed control amounts based on the evaluation value.

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48.       The control system according to any of claims 45 to 47, wherein the judgment device compares the observation information and the reference information in the comparison portion and sends difference information as the comparison result so that the received comparison result is evaluated in at least one of the control target devices, and narrows a range in which the control amounts are randomly changed so as to increase an occurrence rate of control amounts corresponding to evaluations of small difference

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information to make the observation information approach the reference information.

49. The control system according to any of claims 45 to 48, wherein the judgment device transmits large-small information indicating which of the observation information and the reference information is larger, and at least one of the control target devices narrows a range in which the control amounts are randomly changed so as to counterbalance large information and small information of the large-small information based on the received comparison result to make the observation information approach the reference information.

50. A control target device comprising the control system according to any of claims 33 to 49.

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51. A judgment device comprising the control system according to any of claims 33 to 49.